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Reply to Office Action of: September 22, 2003
Family Number: P1998J096 US2

REMARKS

The present invention relates to gas engine oils of enhanced life as evidenced by a reduction in viscosity increase, oxidation, nitration, TAN increase, and TBN depletion comprising a base oil of lubricating viscosity in a particular combination of antioxidants and viscosity index improver additives.

The Applicants thank the Examiner for the interview of September 9, 2003. In that interview Applicants agreed to amend the claims to include the most restrictive ZDDP range and to provide additional data supporting the range of the VI improver.

The Applicants have amended claim 1 to include a further limitation that the antiwear additive be present in the amount of about 0.2 to 0.5 vol %. Claim 6 has been modified in a similar fashion changing the previous limitation of the antiwear additive from about 0.05 to 1.5 vol% to about 0.2 to 0.5 vol%. Support for this amendment is found in the first full paragraph on page 12 and therefore adds no new matter.

Rejection Under 35 U.S.C. §103

Blahey

In the Office Action of September 22, 2003, the Examiner rejected claims 1, 4-6 and 9-14 under 35 USC §103(a) as being unpatentable over Blahey (USP 5,726,133). The Examiner found the present invention obvious in light of Blahey for two reasons. First, the Examiner stated, "Blahey differs from the claims in that he does not specifically teach that the base stock does not contain an oil having a viscosity of 20 cSt or higher. However, it is well settled that the omission of a component and its function from a combination is an obvious expedient if the remaining components perform the same function as before."

The Applicants respectfully suggest that the Examiner has misinterpreted Blahey's teachings concerning viscosity index improvers. The present invention, a single grade oil, is not obvious in light of Blahey because one of ordinary skill in the art would never consider using Viscosity Index Improvers (VII) in a single grade oil for two reasons: usability and cost.

First, as the '133 patent teaches, "viscosity index improvers (VII's) may be any polymer which imparts multifunctional viscosity properties to the finished oil," column 4, lines 58-60 (emphasis added). As was discussed in the interview, and shown by numerous examples, one

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of ordinary skill in the art understands that in order to make a multigrade oil the final formulated oil must contain at least 6% viscosity index improvers. Thus, the '133 patent does not suggest or teach that a VII's could be useful in any oil, let alone a single grade oil, in concentrations of less than 6%. However, the present invention only uses viscosity index improvers up to 3%. Application at page 10, lines 18-20. Thus, Blahey does not teach nor suggest using VII's at the treat rate.

Also, the '133 patent does not teach using VII's to thicken oil. Indeed no one of ordinary skill in the art would ever consider the prospect due to cost considerations. VII's cost twice as much as mineral oils. One of ordinary skill in the art would never use a VII to improve the viscosity of a single grade oil. And indeed, this is exactly what the '133 patent teaches. The '133 patent varies viscosity using a 1200N oil (see examples), not using a low treat rate of viscosity index improver. Because of their expense, one of ordinary skill in the art would not consider employing expensive viscosity index improvers as thickeners for a single grade oil. They would, as the '133 patent does, use a 1200N oil.

Therefore the Examiner's statement, "However, it is well settled that the omission of a component and its functions from a combination is an obvious expedient if the remaining components perform the same function as before", does not apply in this case. Specifically, Blahey does not teach the use of viscosity index improvers to change the viscosity of a single grade oil. Therefore, if one were to remove the 1200N base oil, as is required by the present invention, the remaining components in Blahey's single grade oils would not be sufficient to meet the 13.5cSt kinematic viscosity at 100°C. That is, the remaining components do not achieve the same results as the present inventions use of the viscosity index improver in a single grade oil.

In the Examiner's second reason that the present invention is obvious in light of Blahey, the Examiner notes that it would be *prima facie* obvious to increase the kinematic viscosity of the inventive oil to 13.2 cSt at 100°C because Blahey teaches to raise the viscosity to 13.5 cSt. While the Examiner may be correct that it would be obvious to increase the kinematic viscosity of a single grade oil to 13.2 cSt @ 100°C, what is not obvious is the method to do so. Blahey teaches, as was well known in the art, to use an inexpensive, more viscous (1200 N) base oil to achieve the viscosity specification.

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The present invention teaches something completely different and contrary to the prior art. The present invention teaches to increase the viscosity of a single grade oil using more expensive viscosity index improvers at a treat rate far below their normal rate (which would be used to impart multi viscosity functionality). The inventors then unexpectedly found that in using the VI improver, there was a synergistic and unexpected improvement in less viscosity increase over time, oxidation reduction, nitration reduction, less TAN increase and less TBN depletion. None of these effects would have been expected from using the VI improver at any treat rate let alone the low treat rates of the present invention.

Applicants respectfully request that the Examiner remove her 103 rejections in light of the interview which is also reflected in the discussions herein.

Inoue

The Examiner also rejected claims 1, 4-6, 9, 10, 12, and 14 as being obvious over Inoue (USP 5,744,430). In the interview, the Examiner agreed that Inoue teaches a critical lower level for ZDDP to be no less than 0.54 mass %¹ by elemental phosphorous (see table 1, CE 3, and Table 2, CE 11). The amount of ZDDP present is critical to Inoue's invention. Specifically, in these comparative examples, the weight percent ZDDP was the only item that is changed, and, once changed, the invention fails. Therefore the 0.54 mass % by P is a critical lower limit taught by Inoue.

Applicants have amended their claims to further limit the invention to include ZDDP in the range from 0.2 to 0.5 vol % which corresponds to a treat rate of ZDDP of 0.201 to 0.504 mass % by phosphorous.² This treat rate is below the critical treat rate of 0.54 mass % by

¹ The 0.54 wt % P corresponds to Inoue's claims 0.04 to 0.09 wt% ZDDP because the additive is 7.2 wt%P as shown in Col 11, lines 29-30.

² The Calculations are as follows.

The density of the ZDDP used in the Oloa 1255 (NGEO additive system B) is 1.1203 g/ml and contains 8% by mass elemental phosphorous.

As per our claims, a maximum of 0.5 vol% ZDDP in 100ml finished product therefore contains .56 g ZDDP (0.5 ml ZDDP x 1.1203 g ZDDP/ml ZDDP).

100 ml of finished fluid weighs 88.36 g (density of the finished oil is .8836 g/ml).

Thus the weight percent of ZDDP is .56 g ZDDP/88.36 g finished product = 0.63 mass% ZDDP.

Since this ZDDP has 8% elemental phosphorous, the elemental phosphorous in the final product is 0.63 g ZDDP x 0.08 g P/g ZDDP = 0.504 g P.

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phosphorous as taught as a critical lower limit. Since Inoue specifically teaches away from using less than 0.54 mass % P, it is not obvious that the present invention would work using less than that amount. The present invention is therefore not obvious in light of Inoue.

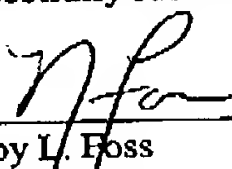
Applicants maintain their previous arguments presented in their respond to Final as to why the present invention is not obvious in light of Inoue as well. However, in light of this additional limitation, the present invention cannot be obvious in light of Inoue.

Additional Data.

In the interview of September 9, 2003, the Examiner noted that while the present invention claimed a range of 0.1 to 3.0 vol% VII, the examples only showed a 2.0 vol% VII. The Examiner invited the Applicants to present further data to back up their claim range. Applicants include herein a 1-132 affidavit presenting the additional data justifying the range.

For these reasons, Applicants humbly request that the Examiner withdraw her rejections and allow this application.

Respectfully submitted,



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☒ Pursuant to 37 CFR 1.34(a)

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